

# RelAirConf

## Configuration Software for the Wireless-To-Wired M-Bus Gateways RelAir R2M Home / Pro



Configuration And Diagnostics           Rest         Filter           Period         Rest         Filter           Operation         Rel         80         73         7 <th>File Language</th> <th></th>	File Language												
Operation         Mark         Ver.         RSSI         Age         RSJ.         VML         Key         Data           00000001         EEL         66			d Dia	gnosti	cs			1	// 5/				
1000001 786/772       REL REL 9600771       66 REL 9800772       Status       Commands         0900071 9000710       REL REL 9000712       86 REL 9000712       83 REL 9000713       27 REL 9000713       7 REL 9000713       7 REL 9000713       7 REL 9000713       7 REL 9000713       9 REL 9000713       9 REC 9000713       9 REL 9000713       9 REL 9000713	earch							×		Filter			
2000002       REL       96       Contractor         9980701       REL       80       -53       7       /       /       ////////////////////////////////////	evice	Man.	Ver.	RSSI	Age	RSL	WL	Key	Data				
09080702         REL         80         -36         27         /         /         ////////////////////////////////////		REL	96		2						General		Commands
9990702         REL         80         -38         25         -         <									1				
0000022         REL         80         -/2         18         /         /         /         // <td< td=""><td>09080702</td><td>REL</td><td>80</td><td>-38</td><td>25</td><td>1</td><td></td><td></td><td>1</td><td></td><td>Signal Strength</td><td>0 dbm</td><td></td></td<>	09080702	REL	80	-38	25	1			1		Signal Strength	0 dbm	
17000284       TW       51       -12       7       -       -       ×       ×       In Radio Scan List       In Radio Scan L	00000402	REL	80	-42	18	1	1	×			Last Received Signal	0 seconds ago	
00000032         Ext         80         0         0         7         X         Q?           00000033         EXt         104         -42         0         7         X         Q?           00000033         REL         56         56         10         7         X         Q?           00000033         REL         56         56         10         7         X         Q?           Renote Cateway has no key for the meter but needs one in a decrypt messages.         Key Status         A decryption key is required but missing.	17000284 00000301	ITW REL	51 80	-42 0	7 0	1	1	Â	×		In Padio Scan List	. / Slot 18	
0001181       SN       104       -42       0       ✓       In Whitelist       ✓       Stot 18         20000003       REL       96       ✓       ✓        Marcine       Marcine         Encrypted       ✓       ✓       ✓        Marcine       Marcin								×				V 00010	
Key Status         Benote Cateway has no key for the meter but needs one in orderrypt messages.           A decryption key is required but missing.	00041881	SEN	104				Ý.	^	- X		In Whitelist	V Slot 18	
Key Status decrypt messages. A decryption key is required but missing.											Encrypted	$\checkmark$	
											Key Status		e meter but needs one in order to
											Data Status	A decryption key is required but mi	ssing.
Find Gateways Refresh Gateways Auto Configuration Abort All	Find Gateways	Refrest	n Gateway:	s Auto	Configural	tion					Abort All		

**User Manual** 



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#### This documentation is valid from software version: V1.1.3

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## 1 Description of RelAir R2M Gateways

The RelAir R2M allows you to integrate up to 63 Wireless M-Bus meters into your existing M-Bus installation. For this purpose the OMS-compliant gateway stores the meter data and answers a request by the M-Bus Master with the last answer telegram. The Gateway receives devices with wireless M-Bus interfaces compliant with EN13757-4 at 868 MHz in S1, T1 or C1 mode and is OMS compliant. The RelAir R2M decodes unencrypted or AES encrypted telegrams according to Mode 5 or 7.



Picture: Wireless M-Bus system with PadPuls M2W, RelAir R2M Gateway and PW250

Because of the configurable whitelist it is of course possible to run several RelAir R2M in one M-Bus network. Due to the integrated mini USB interface the RelAir R2M can also be used as a full operational Wireless M-Bus Master, which e.g. in combination with MBSheet enables a read out. The gateway works without an external power supply and is either supplied from the M-Bus (5 standard loads) or via the USB interface.

#### Attention: Never connect a M-Bus Master and a USB cable at the same time!

A configuration of the whitelist and the receive mode (C1, S1, T1) is absolutely necessary. With the free PC software RelAirConf the setting of the parameters, the keys and the whitelists is very comfortable.

You can get this software here:

- On our homepage <u>www.relay.de</u>
- On the CD "Tools&Docs" enclosed with the product



## 2 Installation

The RelAirConf software for parameterizing the Wireless M-Bus to M-Bus Gateways RelAir R2M is a 32-bit application that can be executed on an IBM-PC compatible computer under the operating systems Windows 10/8.1/7.

If you want to perform the configuration via the USB interface, please first install the FTDI driver for the virtual comport of the RelAir R2M from our homepage www.relay.de, the CD "Tools & Docs" or from the site of the chip manufacturer: <u>http://www.ftdichip.com/Drivers/VCP.htm</u>. Subsequent connect the USB cable to a free USB port on the PC. Now a new virtual serial port should be created in your control panel. Please choose this new serial port later in the RelAirConf software.

If you want to configure the gateway (s) in an M-Bus system, you need transparent access to the M-Bus via a serial interface of the used M-Bus level converter. The serial interface can be a real RS232C or even a virtual serial comport e.g. a USB or Ethernet interface.

Please start the file "RelAirConf-x.y.z.exe" from Windows Explorer or via "Start - Run" to install the software. Please note that the file must not be started from a network drive. In the file name are the placeholders x.y.z for the corresponding version number, e.g. 1.1.1. The language of the installer is automatically selected based on the language of your operating system. During installation, you will be asked to accept the license terms. On the desktop, a link to the program "RelAirConf" and the uninstall program "Uninstall RelAirConf" will be created. Please first execute the uninstall program before installing a new version if there is already an older version.

B RelAirConf 1.1.2 Setup	8
Setup - RelAirConf 1.1.2	
Relay M-BUS solutions	
Welcome to the RelAirConf 1.1.2 Setup Wizard.	
Next > Q	uit



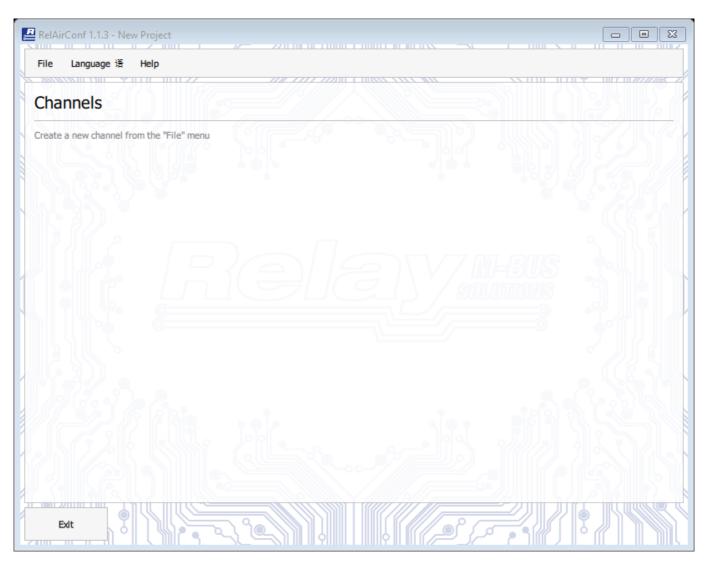
## **3** Operation

The program is started by double-clicking on the icon shown on the right.



## 3.1 Fast pass manual configuration

When you first start you'll see the user interface with a new, empty project:



A project is a logical group (= property or site) of channels to which one or more gateways are assigned. A channel may include a gateway (e.g., via the USB interface) or multiple gateways connected via the M-Bus interface of an M-Bus level converter. A channel always includes a serial or virtual serial interface of the used PC. All settings and meters are saved in the associated project file. When restarting the program, the last active project is automatically opened.



In the first step you create a new channel: RelAirConf 1.1.2 - New Project Menu "File - New Channel" S III III 11 2 1001 or use the keyboard shortcut "Ctrl+N" File Language 语 Help New Channel Ctrl+N 2 Please enter a name and a description for this channel in the following dialog: New Project Open Project Ctrl+O New Channel Save Project Ctrl+S Comport 1 Save Project As M-Bus Level Converter PW250 an COM1 Open Key File Cancel Accept Exit Ctrl+Q

With the button "Accept" the channel is created and displayed on the program interface. You can also create additional channels here, as the following figure shows.

ile Language 语			
hannels			
Comport 2 M-Bus Level Convert	ter PW60 an COM2	Comport 1 M-Bus Level Converter PW250 an COM1	
0 Gateways, 0 Meters		0 Gateways, 0 Meters	
Delete	Open	Delete Open	
		JICT /	



Now open the new channel and select the appropriate comport. In this case, this is the PC internal, serial PCI port COM1. The virtual ports of the RelAir R2M gateways, which may be connected via USB, appear in the list as COMx (USB Serial Port). But beware: That could also be virtual ports of other manufacturers. If you have reconnected a gateway via USB, you can refresh the list with the "Update" button. A manual input of the serial port is alternatively possible if it should be missing in the list. To do this, move the slider from "Auto" to "Manual".

	rConf 1.1.2 - New Project	×
	Language 语 Help	
Selec	ct A Serial Port	
Auto	Manual	Refresh
Device	COM1 (PCI Serial Port (COM1))	\$ ?
Baud	COM1 (PCI Serial Port (COM1))	?
4.5	COM2 (PCI Serial Port (COM2))	
	COM4 (Lantronix CPR Port (COM4))	
Bac	*	Next

Now we recommended to save the project with the created channels first: Menu "File - Save Project" and specify the folder together with the file name. Then click on the button "Next" and come to the actual main window "Configuration and Diagnosis", in which all settings of the gateways of this channel can be done.

Please start the search for the RelAir R2M devices with the button "Find Gateways". Depending on the number of gateways and the number and address distribution of real M-Bus meters, it may take a while (15 minutes and more are possible) to find all the devices. In the following example 3 gateways have been found:



Configurati	on An	d Dia	gnosti	CS								
earch						×		Filter				38.95
evice	Man.	Ver.	RSSI	Age	RSL	WL	Кеу	Data				
1000001	REL	96	5						Gen		Status	Commands
2000002	REL	96										
3000001	REL	96										
88776601	REL	80	-42	0	1	×						
78567702	REL	80	-50	0	1	×			Name	3000001		( ? )
80006229	KAM	53	-62	0	1	×	×					
88776602	REL	80	-44	0	1	×						
00000301 00000302	REL	80 80	-37 -38	0	1	×			Pri. Addr.			(?)
78567701	REL	80	-38	0	1	××			-			
00000401	REL	80	-45	0	1	×	×					
65011680	EFE	19	-29	0	1	x	Ŷ		Sec. Addr.	36 60 48 AC	30 00 00 01	( ? )
60136697	ESY	16	-64	0	2	â	â					
00000402	REL	80	-29	0	1	Ŷ	~					
09080701	REL	80	-36	0	1	x				3000001, R	EL, 96, Radio converter (system sid	ie) ?
17000284	ITW	51	-63	0	1	×	×					
09080702	REL	80	-37	0	1	×						
61596629	DME	65	-66	0	1	×	×		Firm. vers.	1.3.2		?
00030695	SEN	124	-60	0	1	×						
00053928	SEN	11	-64	0	1	×	×		Mode	т		\$ ?
									Discard			Apply
									Discard			
Find Gateways	Refres	n Gateway	s Auto	Configurat	ion				Abort All	J.		1407

Please repeat the search again if not all devices were found during the search. The Radio Scan List (RSL = the list of receivable wireless M-Bus meters) of each gateway is automatically read after the search. By clicking on the arrow in front of the ID of a gateway, the view of the respective RSL can be opened or closed.

The settings of the receiver marked in the left area can be seen in the right area of the tabs "General", "Status" and "Commands". Please first set the reception mode for the Wireless M-Bus via the "Mode" selection box according to the transmitters in the system. There are modes S, T and C to choose from. If you have changed a field and have not yet transferred it to the RelAir R2M, this field will be highlighted in yellow. With the button "Apply" the changes are transferred to the gateway. Please first set the correct mode for all receivers.

If you click the question mark after one of the fields, you will see a detailed explanation of that field. After setting the mode, the RelAir R2M waits for telegrams from radio transmitters. At this point you should delete the lists of the received transmitters (= Radio Scan List RSL) of the RelAir R2M. Under certain circumstances, these could be meters that sent with the previously selected mode. Deleting the RSL can be done by three different ways:



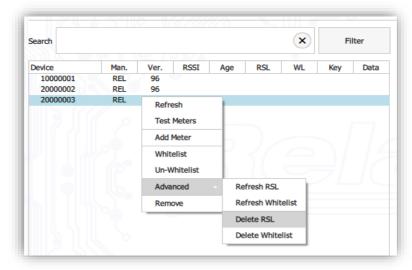
1. For all receivers wit the button "Auto Configuration" - "Clear RSSI"

Auto Configuration									
Before starting the Auto Configuration, make sure that all Gateways are listed. You may also want to wait and refresh the meter lists of the gateways until you see all the meters you would expect.									
Once you started the Auto Configuration, all gateways will be scanned again to make sure that all data is up to date. This may fail silently if at least one of the gateways does not respond but no meter configuration will be changed in that case in order to prevent corruption.									
no meter configuration will be changed in that case in order to prevent corruption. If all gateways responded in an expected manner, the algorithm will start whitelisting meters if there is no device present already having that secondary address. If there are multiple non- whitelisted meters with the same secondary id, the one with the highest signal strength will be whitelisted. Additionally, keys will be automatically be applied if available to non-clashing whitelistable devices. You can also reset the known RSSI values. After resetting those, you may have to wait some time until all meters are rediscovered and listed as being part of the RSL again.									
unui an meters are rediscovered	Cancel Clear RSSI Start								

2. For single receivers in the right part of the window in the sheet "Commands" using the button "Radio Scan List" - "Delete".

General	Status	Commands
Refresh	Test Connections	
Radio Scan List	Refresh	Delete
Whitelist	Refresh	Delete

3. For single receivers from the context menu with the right mouse button and "Advanced - Delete RSL"





Now you have to keep the receivers on reception for a sufficiently long time so that as many of the stations as possible are included in the Radio Scan List (max. 488 units). The RelAir R2M constantly expands the RSL in the background when new devices are received. Depending on the transmission interval of the meters, you should let the receivers scan for at least half an hour. If the system has transmitters that transmit less frequently, e.g. every 2 hours, you have to wait longer. After the waiting time please press the button "Refresh Gateways" to read the RSL of all gateways are displayed:

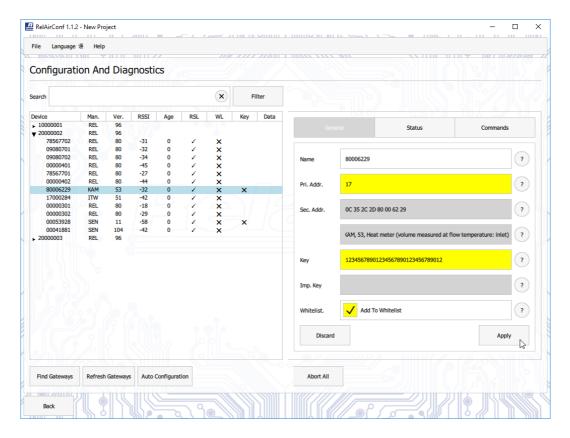
- 11 //11 1	- 5011	х. п.	n	22.1					0	<i>"</i> » (CCCCCCCC)	
Configurati	on An	d Diag	gnosti	cs							
earch		11.0 15				×	FI	ilter			2. S.J.
Device	Man.	Ver.	RSSI	Age	RSL	WL	Key	Data			
. 10000001	REL	96		_					General		Commands
2000002	REL	96							General		communus
78567702	REL	80	-31	0	1	×					
09080701	REL	80	-32	0	1	×					
09080702	REL	80	-34	0	1	×		- 14	Found During Scan		
00000401	REL	80	-45	0	1	×			· · · · · · · · · · · · · · · · · · ·		
78567701	REL	80	-27	0	1	×					
00000402	REL	80	-44	0	1	×			Meters	12	
80006229	KAM	53	-32	0	1	×	×		Pieters	**	
17000284	ITW	51	-42	0	1	×					
00000301	REL	80	-18	0	1	×			RSL Entries	12	
00000302	REL	80	-29	0	1	×			RSL Entries	12	
00053928	SEN	11	-58	0	1	×	×				
00041881	SEN	104	-42	0	1	×				0	
. 2000003	REL	96							Whitelist Entries	0	
111110											
Find Gateways	Refresh	n Gateways	6 Auto	Configurat	ion				Abort All		

Here the list of the receiver with the ID = 20000003 is expanded in the view to see the 12 entries of the RSL. These properties are shown in the list for the individual meters

- Man.: Manufacturer code from the Wireless M-Bus Protocol
- Ver.: Version from the Wireless M-Bus Protocol
- RSSI: Receive signal strength indicator RSSI (from the time of saving into the RSL)
- Age: Age of the last received telegram, in seconds: only for meters in the Whitelist
- RSL: marked with  $\checkmark$ , if the meter is in the Radio Scan List
- WL: marked with  $\checkmark$ , if the meter is in the Whitelist, otherwise  $\mathbf{X}$
- Key.: marked with  $\checkmark$ , if the key is programmed, marked with  $\mathbf{X}$ : key is missing empty: no key required
- Data: See on page 12



You can now enter a possibly required key (32 characters consisting of 0 to 9, A to F) per receiver for each meter to decode the telegram and at the same time add the counter to the whitelist. All meters that are in the whitelist of the receiver are simulated as wired M-Bus slaves by the gateway. The whitelist can contain up to 63 meters. You can enter a unique primary address in the "Pri.Addr." field, which can later be used as an alternative to the secondary address for reading the meter through the M-Bus. Fields changed during edit are highlighted in yellow. Write the changes to the gateway with the "Apply" button. a click on the question mark also gives you an explanation of the corresponding field. A click on the question mark shows you an explanation of the corresponding field.



By right-clicking on the meter, you can also set all the meters of a receiver to the whitelist at the same time using the context menu:

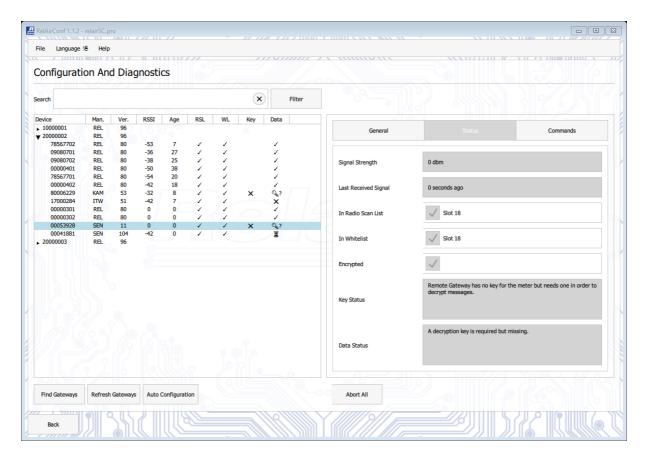
Device	Man.	Ver.	RSSI	Age	RSL	WL	Key	Data
1000001	RE	06						
78567702	RR	efresh		0	1	×		
78567701	R	est Meters		0	1	×		
13345601	R			0	1	×		
00000401	R A	dd Meter		0	1	×		
00000402	R	/hitelist		0	1	×		
17000284	п "	mitenst		0	1	×	×	
00000301	RU	n-Whitelis	t 🗌	0	1	×		
00000302	R	dvanced		0	1	×	×	
80006229	ĸ	uvanceu		0	1	×	×	
09080701	RR	emove		0	1	×		
09080702	REL	80	-29	0	1	×		
00000202	REL	80	-38	0	1	×		
00041881	SEN	104	-42	0	1	×		
00000201	REL	80	-38	0	1	×		
00053928	SEN	11	-39	0	1	×	×	
00030695	SEN	124	-37	0	1	×		
2000002	REL	96						
20000003	REL	96						



#### Attention:

Please make absolutely sure that the transmitters are clearly assigned to exactly one receiver, i.e. only be in the Whitelist for just one RelAir R2M. Otherwise collisions would occur in the M-Bus network, because each meter of the whitelist is simulated by the gateways as a wired M-Bus slave. This would prevent a readout of the data in the M-Bus network.

After the whitelisting has been done the gateway waits for the next telegram of the transmitters. Only after the next reception the data can be read out via the M-Bus. This may require a good half hour, depending on the transmission frequency of the meters.



The "Data" column shows the status of the decoding for each meter. The status of a single meter can be updated with the context menu "Test Meter". If you right-click on a receiver, you can update the status of all counters of this receiver: Context menu "Test Meters". The aim should be to see the check mark  $\checkmark$  in the column "Data" of all meters that are in the whitelist.

The possible symbols mean:

- $\checkmark$  Data has been received and decoded correctly.
- So far no data has been received, please wait and use "Test Meter".
- A key is required, but none is set.
- $\bigcirc$   $\bigcirc$  The message could not be decrypted. Please wait or change the key.

After you have made all the settings, you should save the project. Please note that the keys of the meters cannot be read out of the RelAir R2M devices.



### 3.2 Automatic Configuration

The steps of key input and manual addition of meters to the whitelists of the individual receivers in a system with more than one RelAir R2M can be mostly automated, in contrast to the explanations in chapter 3.1.

#### 3.2.2 Import of Keys

You can read the keys from a CSV table and automatically assign them to the meters to avoid manual key input. Some manufacturers supply files for individual meter keys per delivery, while other manufacturers use ex-factory so-called global manufacturer-dependent keys, which apply to all meters supplied, at least for one delivery. The following options are available for importing keys into RelAirConf for individual lines in the text file:

- 1) ID, key: individual key for a single ID Example: 67146207, Ad4ed92b1771435ab46b49b77d73437f
- 2) Manufacturer code, key: global key for all meters of this manufacturer Example: ZZZ, Bd4ed92b1771435ab46b49b77d73437f
- 3) Manufacturer code, ID, Key: individual key for a single ID of the manufacturer XXX XXX,61010274, 2d4ed92b1771435ab46b49b77d73437f #from here: comment

Instead of a comma, a semicolon can also be used. Spaces are ignored.

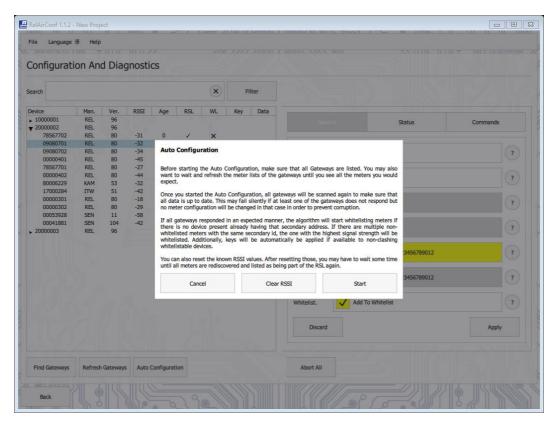
RelAirConf 1.1.2		2011	-				ymm i		IX		
File Language	语 Help	1 111 1 2									
New Channel	Ctrl+N										
New Project					×	F	ilter				
Open Project	Ctrl+0	RSSI	Age	RSL	WL	Key	Data		- 14-		
Save Project	Ctrl+S	-31	0	1	×			Gene	eral	Status	Commands
Save Project As		-32 -34 -45	0 0 0	\$ \$ \$	××××			Name	09080701		?
Open Key File		-27 -44 -32 -42	0 0 0 0 0	5555	× × × ×	×		Pri. Addr.			?
Exit	Ctrl+Q SEN 11		0	1	×××××	×	14	Sec. Addr.	00 50 48 AC 09	08 07 01	?
00041881 20000003	SEN 104 REL 96	-42	0	2	Ŷ	^			09080701, REL	, 80, Other	?
								Кеу	123456789012	34567890123456789012	?
								Imp. Key	123456789012	34567890123456789012	?
								Whitelist.	🗸 Add To W	Vhitelist	?
								Discard			Apply
Find Gateways	Refresh Gatew	ays Auto	Configura	tion				Abort All		a) ((e	(S) (S
Back				a							



The menu entry "File - Open Key File" opens a dialog for selecting the file. Subsequently, the respective keys are assigned to the individual meters or all meters of a manufacturer. The key of a meter is entered into both the "Key" field and the "Imp. Key "(Imported key). The "Key" field is then highlighted in yellow, as usual, to indicate that the key has been changed and still has to be written to the gateway with the "Apply" button.

#### 3.2.3 Automatic Whitelisting

The software offers the possibility of automatically assigning the meters to the whitelists in an M-Bus system with more than one RelAir R2M based on the received signal strength indicator RSSI. This function relieves the user of the laborious manual assignment and enters each meter at the gateway with the individually strongest reception. After setting the reception modes in the gateways and, if necessary, importing the keys (see section 3.2.2), start the automatic whitelisting by clicking on the "Auto Configuration" button:



The program now informs you that you should not start this function until all receivers and meters have been found. If this is the case, it is advisable to first delete the RSSI values (field strengths) of all meters, because these originate from the time of the first reception of the respective meter and could therefore be outdated. With the button "Clear RSSI" these data are deleted and updated with the next reception. This means that you should wait here for a while depending on the transmission intervals of the meters, e.g. 15 minutes.

After this waiting time you can start the automatic configuration with the button "Start". The data of the meters are then updated, following the meters are assigned, the imported keys are entered and each meter is written into the whitelist for exactly one RelAir R2M.



## 3.3 Description of all menu entries

The main menu of the RelAirConf software offers these three points: **File / Language / Help**. Some commonly used submenus have a keyboard shortcut that you can use directly to quickly execute the command without a mouse. An example is the command "Ctrl-Q" (Exit). The key "Ctrl" is e.g. on German keyboards also labelled with "Strg".

### 3.3.1 Menu "File"

		New Channel:
File Language 语	Help	Creates a new channel within the active project
New Channel	Ctrl+N	New Project:
		Creates a new project (collection of channels)
New Project		Open Project:
		Opens an existing project for editing. The file name of the active
Open Project	Ctrl+O	project is displayed in the title bar.
Save Project	Ctrl+S	Save Project:
		Saves the current project under the existing file name
Save Project As		
		Save Project As:
Open Key File		Saves the current project under a new file name
		Open Key File:
Exit	Ctrl+Q	Reads the keys from a CSV file (chapter 3.2.2)
		Evit

**Exit:** Closes the software

### 3.3.2 Menu "Language"

File	Language 语 Help	
Conf	· · ·	
Jte	German	
Search		

Here you can switch the language of the user interface between German and English. The change is effective immediately without restarting.



#### 3.3.3 Menu "Help"

File Language 语	Help
Channels	Toggle Log Ctrl+L
Create a new channel f	Select Theme
	License
	Open Manual
	About

In addition to the PDF manual and the license information, the "Help" menu also includes the option to show protocol window and change the colour design of the user interface.

#### Toggle Log:

	e语 Help		CONTRACTOR NO.		
Channels					
Create a new char	nel from the "File	e" menu			
Exit	LL1(	Ðlæ	2]//s	VI-BUS Lumons	
	6				
DBG] 15:45:56 de DBG] 15:45:56 de		r			
DBG] 15:45:56 de	leting GuiMeter				
DBG] 15:45:56 de DBG] 15:47:59 de	serializing setup				
DBG] 15:47:59 de DBG] 15:47:59 de		t			
[DBG] 15:47:59 de		1579383906304			
DBG] 15:47:59 de	serialing gateway	у			
DBG] 15:47:59 no DBG] 15:47:59 no					
DBG] 15:47:59 de	serializing meter				
DBC1 15:47:50 no	key found for "26	59717000284°			
	key found for "26				

Shows or hides a window for logging communication with the gateways. This can provide information about possible communication errors in the event of an error.

#### Select Theme:

Here you can choose between various colour designs for the user interface, e.g. to increase the contrast or to get an inverse representation.

#### License:

Shows the license information about the software and the used libraries.

#### **Open Manual:**

Open this guide in your PDF viewer.

#### About:

Shows the file paths to the settings file and the automatically generated log file (useful for troubleshooting). You will additionally see a link to Relay GmbH.